

IN THE CLAIMS

Please replace all prior versions, and listings, of claims in the application with the following list of claims. Additions are indicated by underlining and deletions are indicated by strikeouts and/or double bracketing.

1-33. (Cancelled)

34. (Currently Amended) An apparatus, comprising:

a device comprising a predetermined reaction site having a volume of less than about 1 ml;

a semipermeable membrane defining at least one wall of the predetermined reaction site that has a permeability to oxygen and a permeability to water vapor that is at least one order of magnitude lower than the permeability to oxygen; and

a sensor integrally connected to the device, the sensor comprising a fluorescent molecule, wherein the sensor is able to determine an environmental factor associated with the predetermined reaction site, the environmental factor being at least one of:

pH,
molarity,
glucose concentration,
pyruvate concentration,
color,

a concentration of a dissolved gas,
osmolarity,
glutamine concentration,
apatite concentration,
turbidity,
a concentration of an amino acid, and
a concentration of an ion.

35. (Previously Presented) The apparatus of claim 34, wherein the device is constructed and arranged to maintain at least one living cell at the predetermined reaction site.

36-40. (Cancelled)

41. (Previously Presented) The apparatus of claim 34, further comprising a processor is integrally connected to the article, the processor able to determine a response based on a measurement from the sensor.

42. (Previously Presented) The apparatus of claim 41, wherein the processor comprises an electronic circuit.
43. (Previously Presented) The apparatus of claim 34, the device comprising a plurality of reactors, wherein one of the plurality of reactors comprises the predetermined reaction site
44. (Previously Presented) The apparatus of claim 34, wherein the predetermined reaction site has a volume of less than about 500 microliters.
45. (Cancelled)
46. (Original) The apparatus of claim 34, wherein at least one surface of the predetermined reaction site comprises a polymer.
47. (Original) The apparatus of claim 34, wherein the living cell is a mammalian cell.
48. (Previously Presented) The apparatus of claim 34, further comprising a processor able to receive a signal from the sensor and produce a signal to an actuator integrally connected to the chip able to alter the environmental factor.
49. (Currently Amended) An apparatus, comprising:
a device comprising a predetermined reaction site having a volume of less than about 1 ml;
a semipermeable membrane defining at least one wall of the predetermined reaction site that has a permeability to oxygen and a permeability to water vapor that is at least one order of magnitude lower than the permeability to oxygen;
a first sensor integrally connected to the device, the first sensor able to determine at least one of temperature and pressure; and

a second sensor integrally connected to the device, the second sensor comprising a fluorescent molecule, wherein the second sensor is able to determine a second environmental factor, the second environmental factor being at least one of:

pH,	a concentration of a dissolved gas,
molarity,	osmolarity,
glucose concentration,	glutamine concentration,
pyruvate concentration,	apatite concentration,
color,	turbidity,
	a concentration of an amino acid, and
	a concentration of an ion.

50. (Previously Presented) The apparatus of claim 49, wherein the device is constructed and arranged to maintain at least one living cell at the predetermined reaction site.
- 51-52. (Cancelled)
53. (Previously Presented) The apparatus of claim 34, further comprising a temperature sensor.
- 54-80. (Cancelled)
81. (Previously Presented) The apparatus of claim 46, wherein the polymer is a copolymer.
82. (Previously Presented) The apparatus of claim 34, wherein the living cell is an insect cell.
83. (Currently Amended) An apparatus, comprising:
a device comprising a predetermined reaction site having a volume of less than about 1 ml; and
a semipermeable membrane defining at least one wall of the predetermined reaction site that has a permeability to oxygen and a permeability to water vapor that is at least one order of magnitude lower than the permeability to oxygen;
a sensor integrally connected to the device, the sensor comprising a chromogenic

molecule, wherein the sensor is able to determine an environmental factor associated with the predetermined reaction site, the environmental factor being at least one of:

pH,	a concentration of a dissolved gas,
molarity,	osmolarity,
glucose concentration,	glutamine concentration,
pyruvate concentration,	apatite concentration,
color,	turbidity,
	a concentration of an amino acid, and
	a concentration of an ion.

84. (Previously Presented) The apparatus of claim 83, wherein the device is constructed and arranged to maintain at least one living cell at the predetermined reaction site.
85. (Previously Presented) The apparatus of claim 83, further comprising a processor is integrally connected to the article, the processor able to determine a response based on a measurement from the sensor.
86. (Previously Presented) The apparatus of claim 85, wherein the processor comprises an electronic circuit.
87. (Previously Presented) The apparatus of claim 83, the device comprising a plurality of reactors, wherein one of the plurality of reactors comprises the predetermined reaction site
88. (Previously Presented) The apparatus of claim 83, wherein the predetermined reaction site has a volume of less than about 500 microliters.
89. (Previously Presented) The apparatus of claim 83, wherein at least one surface of the predetermined reaction site comprises a polymer.
90. (Previously Presented) The apparatus of claim 89, wherein the polymer is a copolymer.

91. (Previously Presented) The apparatus of claim 83, wherein the living cell is a mammalian cell.
92. (Previously Presented) The apparatus of claim 83, further comprising a processor able to receive a signal from the sensor and produce a signal to an actuator integrally connected to the chip able to alter the environmental factor.
93. (Previously Presented) The apparatus of claim 83, further comprising a temperature sensor.
94. (Previously Presented) The apparatus of claim 83, wherein the living cell is an insect cell.
95. (Currently Amended) An apparatus, comprising:
a device comprising a predetermined reaction site having a volume of less than about 1 ml;
a semipermeable membrane defining at least one wall of the predetermined reaction site that has a permeability to oxygen and a permeability to water vapor that is at least one order of magnitude lower than the permeability to oxygen;
a first sensor integrally connected to the device, the first sensor able to determine at least one of temperature and pressure; and
a second sensor integrally connected to the device, the second sensor comprising a chromogenic molecule, wherein the second sensor is able to determine a second environmental factor, the second environmental factor being at least one of:
pH,
molarity,
glucose concentration,
pyruvate concentration,
color,
a concentration of a dissolved gas,
osmolarity,
glutamine concentration,
apatite concentration,
turbidity,
a concentration of an amino acid, and
a concentration of an ion.

96. (Previously Presented) The apparatus of claim 95, wherein the device is constructed and arranged to maintain at least one living cell at the predetermined reaction site.